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Cornerstone Technology: Thermal Conversion Process (TCP)

Description

- TCP is a patented bio-remediation process that converts hydrocarbons and organic wastes into clean solid, liquid and gaseous alternative fuels and specialty chemicals.
- TCP was developed by a team of scientists over a 15-year period, utilizing modern engineering to apply basic science principles that have been understood for over two centuries. As such, TCP was created from science, not for science.
- TCP will directly reduce national dependence on foreign oil and supplement existing reserves, while helping to solve the global problems of waste disposal and environmental pollution.
- TCP utilizes low-value waste by-products such as tires, plastics, sludge, municipal solid waste, paper, animal, and agricultural waste as feedstocks.
- TCP is a continuous flow-through process in a controlled environment using water, temperature, pressure and time, with no critical parameters.
- After reprocessing, three separate product streams are produced from the feedstocks:
  1. Clean fuel gas
  2. Light organic liquid (oil)
  3. Solid product (carbon or minerals)

How It Works

- TCP emulates the earth's natural geothermal process, whereby organic material is converted into fossil fuel under conditions of extreme heat and pressure over millions of years.
- TCP mimics the earth's system using pipes and by controlling temperature and pressure to reduce the bio-remediation process from millions of years to mere hours.
- TCP breaks down organic polymers (chains of small molecules) into their smallest units, and reforms them into new combinations to produce clean fuels.

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Steps of the TCP Process

(1) *Pulping and slurrying the organic feed with water*

Feedstock is fed into a hydro-pulper, where it is homogenized and blended with water.

(2) *Heating the slurry under pressure to the desired temperature*

The water-waste mixture is pumped under pressure through heat exchangers to a first stage reactor.

(3) *Flashing the slurry into a lower pressure to separate the mixture*

Processed material enters a flash vessel, where water is vaporized. Steam exits through the top of the vessel, the solid material component is removed from the bottom and the remaining organic liquid continues through the process.

(4) *Heating the slurry again (coking) to drive off water and produce light hydrocarbons*

Organic steam/gas mixture travels through heat exchangers and passes to a coker, where it is pressurized and the temperature is increased. The organic mixture is reformed into fuel gas and light oil, and non-volatile organic compounds (carbon).

(5) *Separating the products*

Fuel gas leaves the reactor, passes through a heat exchanger and then through a condenser where it is cooled. Cooled fuel gas and oil mixture separates. Fuel gases go to turbines or boilers, oil goes to oil storage tank, and carbon goes to carbon storage bins.

Energy Efficiency

- TCP is approximately 85% energy efficient.
- TCP has very low Btu requirements, due to short residence times of the materials in process and to holding of water under pressure.
- TCP uses steam naturally generated by feedstock, thereby recapturing the expended energy.
- TCP generates its own energy.

Environmental Efficiency

- TCP produces no uncontrollable emissions.
- TCP uses recycled water throughout.
- TCP produces no secondary hazardous waste stream.